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Razvitiye Meteorologii v SSSR (Development of Meteorology in the USSR),
 Gidrometeoizdat, pp 50-52, (LC QC857.R9R9).

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CLOUD SEEDING AND RELATED RESEARCH IN THE USSR

P. N. Tverskoy

Further information on the organizations and some of the scientists mentioned in this report can be found in FDD Summary No 51.

Up until recently, meteorologists have devoted most of their attention to the problem of weather forecasts and the use of these forecasts to reduce the harmful effects of weather vagaries. However, the final goal of our study of atmospheric processes must unquestionably be the solution of the problem of active influence on nature, i.e., the problem of controlling the weather and developing methods to combat dangerous atmospheric phenomena. In the light of our present knowledge of atmospheric processes and the ever-growing technical and energy resources at our command, this problem is not so hopelessly insoluble as it might first appear. The successful methods which we already have for combating the first autumn frosts and the promising experiments in dispersing clouds and fogs which have been conducted recently are proof of this fact.

Soviet meteorologists were the first to organize systematic studies of active influence on the atmosphere. The Rain Institute, which was organized in 1931 and reorganized in 1934 as the Institute of Experimental Meteorology /presumably the Leningrad Institute of Experimental Meteorology/, had as its basic task the solution of the problem of active influence on the atmosphere.

The first years of the institute were naturally spent on organizational measures. V. N. Obolenskiy interested some important Soviet scientists in this field and a number of them came to work at the institute, including Professor N. N. Andreyev, V. V. Bazilevich, G. I. Prussakov, and others. But most of the required personnel had to be trained by the postgraduate fellowship method. Among the scientists who have continued their work in this field up to the present are B. V. Kiryukhin, P. N. Krasikov, N. V. Kucherov, V. L. Gayevskiy, V. A. Solov'yev, and V. Ya. Nikandrov.

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The first experiments included those on the protection of plants from the first autumn frosts, and on the dispersal and creation of fogs, as well as preliminary studies of the possibilities of influencing clouds by electrical, chemical, acoustical, mechanical and other methods. For these experiments and for laboratory studies, the institute developed new, complex instruments and built special units, including a powerful Tesla coil to create ions, a powerful X-ray installation, and a "fog chamber," in which fogs very similar to natural fogs could be formed under laboratory conditions. This chamber was used to study the properties of fogs by subjecting them to various types of physical effects. The instruments and units were used for studies in cloud microphysics, in which drop size and number, water content of clouds, and humidity in fogs at low temperatures were determined.

Many other problems were studied, but emphasis was placed on water-vapor condensation processes and coagulation of water drops. In the latter field, the following studies are worthy of special mention: the theoretical generalizations made by V. N. Obolenskiy, V. V. Bazilevich, and others; the numerous experimental studies by Professor M. A. Aganin and others on the establishment of laws for the fusion of drops and the influence of electric charges upon this fusion; the studies by V. V. Bazilevich on the coagulation of drops and the influence of ultrasonic oscillations upon coagulation; the work of V. Ya. Nikandrov on the absorption of ultrasonic oscillations by water vapor; the work of B. V. Kiryukhin and N. P. Tverskoy on the evaporation of drops, on the measurement of humidity at low temperatures, etc.

Finally, we note the series of studies of the condensation of water vapor on hygroscopic substances (creation of artificial fog) and the work of Professor N. N. Andreyev and Ye. S. Selezneva on the chemical analysis of precipitation and on the study of condensation nuclei. This work was not limited to theoretical and laboratory studies, but was also conducted in natural clouds and fogs. For the latter purpose, well-equipped expeditions were organized and specially equipped airplanes were used. The first experiments on throwing various solid particles and powdered ice into clouds were conducted from specially equipped airplanes as early as 1940, with the participation of P. Q. Vorontsov. Unfortunately, these experiments were interrupted by the war. The experiments on throwing dry ice into clouds which have been conducted abroad recently and publicized widely in foreign press were conducted in the USSR before World War II and not without success.

The union of the school of experimental meteorologists with the school of theoretical meteorologists and workers in other branches of meteorology, which was brought about by the incorporation of the Institute of Experimental Meteorology into the Main Geophysical Observatory at the beginning of World War II, had a very beneficial effect and led to the extensive studies now being conducted at the Main Geophysical Observatory. The union of theory and experiment has completely justified itself and was a prerequisite for further progress.

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